Low Mass, Aluminum NOFBX Combustion Chamber Development, Phase I

Completed Technology Project (2011 - 2011)

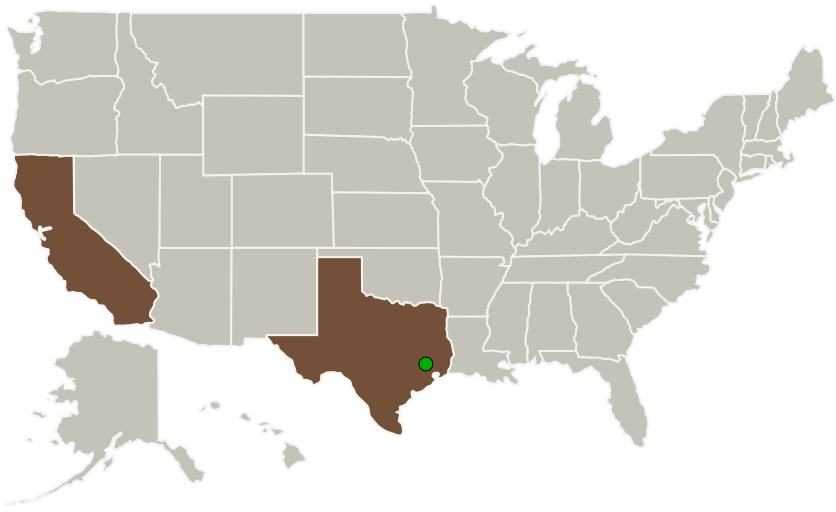
Project Introduction

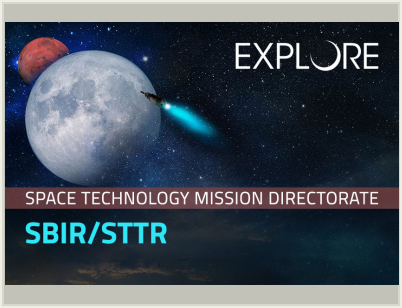
Our team proposes to define a diffusion bonding process for aluminum as an enabling step to ultimately develop an innovative, lightweight, long life, aluminum combustion chamber technology for Non-toxic NOFBX

TM

monopropellant In-Space 100 lbf rocket thrusters and rocket engines in general. In a companion proposal, we are investigating aluminum injectorheads: the results from these two efforts will ultimately allow us to produce an entire NOFBXTM aluminum engine. On a strict density basis, this aluminum engine would be ~30% of the mass of a nickel engine which already has a 22:1 T/W. Optimizing the design for aluminum will drive the performance even higher. This aluminum injectorhead/thrust chamber assembly will eventually be coupled to carbon-carbon nozzle assemblies. The result will be high performance, non-toxic engines with significantly increased Thrust-to-Weight Ratios approaching ~100:1. These engine assemblies can eventually be scaled up for resusable launch vehicle upper and lower stages or down into smaller in-space thrusters

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Micro Cooling Concepts, Inc.	Lead Organization	Industry Veteran-Owned Small Business (VOSB)	Huntington Beach, California
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
California	Texas

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138269)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Micro Cooling Concepts, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Jack M Fryer

Co-Investigator:

Jack Fryer

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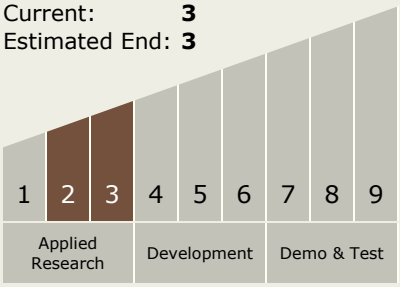
Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.3 Cryogenic

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System